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Environmental
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IEPA MOBILE LABORATORY SCREENING TESTS INFORMATION SHEET

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CONDUCT SCREENING TESTS IN THE IEPA MOBILE LABORATORY?

Several analytical screening techniques utilized in a mobile laboratory setting allow the Agency to quickly detect the existence or absence of many significant toxic materials. Screening techniques generally are simple procedures that provide more rapid results than the detailed chemical analyses performed in a full service laboratory. Results of screening tests can be available in a few minutes to a few hours, allowing field personnel to make informed decisions regarding the degree of hazard (if any) present at a site.

WHAT SCREENING TESTS ARE PERFORMED IN THE IEPA MOBILE LABORATORY?

Narrow-range screening tests used in the mobile laboratory include pH (corrosive potential), Triazine immunoassay (for common herbicides), and PCB (polychlorinated biphenyl) determination. For wider range chemical screening, selected samples are analyzed using gas chromatography. Possible environmental toxicity is evaluated using Microtox (testing the reaction of live organisms).

Microtox is a bioassay that uses live, luminescent microorganisms to determine the toxicity of a substance. Microtox is useful to indicate whether a sample is sufficiently toxic to warrant additional tests, however, no specific chemical identification can be made.

Specific immunoassay techniques can be used for the detection of certain pesticides in water samples or soil samples. Enzyme immunoassay techniques rely on the recognition of pesticides by animal antibodies. A simple color reaction indicates the presence or absence of the pesticide. While available for only a limited number of specific pesticides and herbicides, immunoassays provide rapid, quantitative and cost-effective analytical information. Detection of high amounts of these pesticides or herbicides could indicate the presence of additional compounds in a sample. Pesticides that could be detected by this method are metolachlor, alachlor and the triazine class, including atrazine, which are all commonly used herbicides in Illinois.

Rapid tests for PCBs can be performed selectively on soil and oil samples. Test kits for the screening of polychlorinated biphenyls (PCBs) rely on a color-linked chemical reaction. Other sources of chlorine or chloride may result in a false positive identification. Detections above 10 parts per million (ppm) need to be verified by gas chromatography.

Screening for petroleum products or other organic compounds is performed on aqueous, soil or oil samples using gas chromatography with flame ionization and photoionization detectors (GC/FID-PID). The FID-PID is considered a universal detector that is capable of determining the presence of gasoline, kerosene, diesel fuel, fuel oils, crude oil and a wide range of additional organic compounds.

Broad-spectrum screening involves the use of gas chromatography. Gas chromatography with an electron capture detector (GC/ECD) is used to screen for pesticides and PCBs in water and soil samples. Substances that can be detected by this method are chlorinated hydrocarbon pesticides, PCBs, organophosphate insecticides, and some selected herbicides used in Illinois, such as trifluralin, metolachlor, metribuzin and the triazines including atrazine.

WHAT ARE THE ADVANTAGES OF IEPA MOBILE LABORATORY SCREENING TESTS?

There are many advantages to screening procedures which include the following:

1. Most results can be available in less than 24-48 hours, resulting in the ability to make quicker, informed decisions.
2. Screening tests accurately detect the presence of toxic or pollutant materials.
3. Samples with significant unidentified compounds or significant identified components can be sent to the appropriate full service laboratory for organic identification, inorganic analysis or further toxicity testing. The number of samples sent to the full service laboratory is reduced, resulting in additional time savings.

WHAT ARE THE LIMITATIONS OF IEPA MOBILE LABORATORY SCREENING TESTS?

Although screening techniques can provide valuable information, the following limitations should be considered.

1. While detecting the presence of a compound or a class of compounds, screening tests might not identify all materials present.
2. The mobile laboratory is not now equipped to perform inorganic analyses (metals, cyanides, sulfides, ammonia, etc.).
3. Due to the field extraction techniques used in the mobile laboratory, the gas chromatography detection limits will be above those achievable in the fixed laboratory.
4. Drinking water will not be tested in the mobile laboratory because the detection limits available with the field extraction techniques are not low enough.
5. These techniques are not useful for detecting the presence of bacteria and viruses that could be present in raw sewage or contaminated river water.

For further information, please call the IEPA Springfield laboratory at 217/782-9780.

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